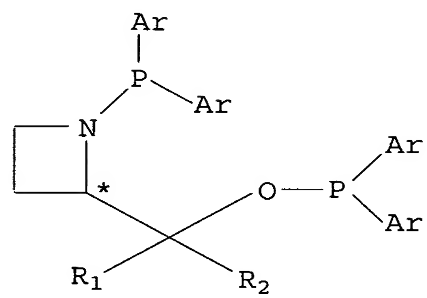
What is claimed is:

1. A chiral phosphine compound of formula (1):



(1)

wherein R_1 and R_2 independently represent

an aryl or heteroaryl group, which may be substituted,

a saturated hydrocarbon group, which may be substituted, and

Ar group independently represents

a heteroaryl group, which may be substituted,

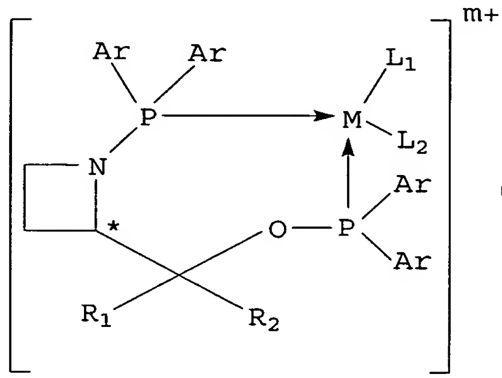
an aryloxy group, which may be substituted, or

Ar groups on the same phosphorous atom are bonded to form an arylene, heteroarylene or alkylene group, which may be substituted, and

* represents an asymmetric carbon atom.

2. A transition metal complex of a chiral phosphine compound of formula (1) as defined in claim 1.

3. A transition metal complex according to claim 2, which is a transition metal complex of formula (6):



$(X^{-})^{m}$ (6)

wherein R_1 and R_2 independently represent

an aryl or heteroaryl group, which may be substituted,

a saturated hydrocarbon group, which may be substituted, and

Ar group independently represents

an aryl or heteroaryl group, which may be substituted,

an aryloxy group, which may be substituted,

a saturated hydrocarbon group, which may be substituted,

or

Ar groups on the same phosphorus atom are bonded to form an arylene, heteroarylene or alkylene group, which may be substituted,

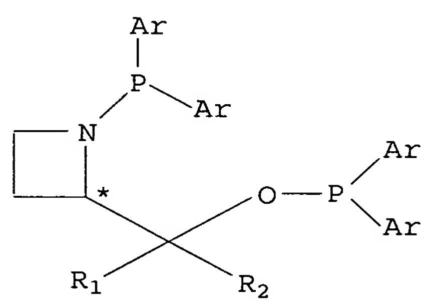
M represents a transition metal,

X- represents a counterion, m is an integer of 0 to 4,

L_1 and L_2 independently represent a ligand, or L_1 and L_2 are bonded to form a divalent single ligand, and

* represents an asymmetric carbon atom.

4. A process for producing a chiral phosphine compound of formula (1):



(1)

wherein R_1 and R_2 independently represent

an aryl or heteroaryl group, which may be substituted,

a saturated hydrocarbon group, which may be substituted, and

Ar group independently represents

an aryl or heteroaryl group, which may be substituted,

an aryloxy group, which may be substituted,

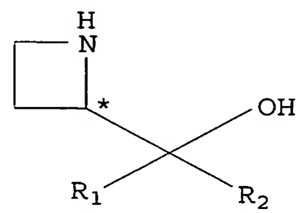
a saturated hydrocarbon group, which may be substituted,

or

Ar groups on the same phosphorus atom are bonded to form an arylene, heteroarylene or alkylene group, which may be substituted, and

* represents an asymmetric carbon atom, which comprises reacting

an optically active azetidine alcohol compound of formula (2):



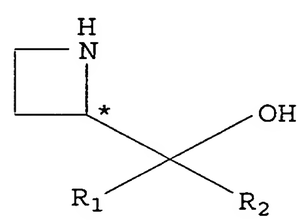
(2)

wherein R_1, R_2 and * represent the same as defined above, with a phosphine of formula (3):

$$XPAr_2 \qquad (3)$$

wherein X represents a halogen atom, and Ar represents the same as defined above.

5. An optically active azetidine alcohol of formula (4):



(4)

wherein R_1 and R_2 independently represent

a saturated hydrocarbon group, which may be substituted, and

* represents an asymmetric carbon atom.

6. A process for producing an optically active organic compound, which comprises asymmetrical reducing a prochiral olefinic compound with hydrogen in the presence of the transition metal complex of a chiral phosphine compound of claim 1.

7. A process according to claim 6, wherein the prochiral olefinic compound is a prochiral olefin compound of formula:

$$(Z_1)(Z_2)C{=}C(Z_3)(Z_4)$$

wherein Z_1 and Z_2 are not the same and independently represent

a saturated or aromatic hydrocarbyl group, which may be substituted,

a group of formula:

$CO\text{-}R_4$,

wherein R_4 represents a hydroxy group, an alcohol residue group,

a group of formula:

$NR_5(R_6)$

wherein R_5 represents

a hydrocarbyl, acyl or hydrocarbyloxycarbonyl group, which may be substituted, and

R_6 independently represents the same group as R_5 or a hydrogen atom, and

Z_3 and Z_4 are the same or different and independently represent a hydrogen atom or the same groups as defined for Z_1 and Z_2; and

the chiral organic compound is a compound of formula:

$(Z_1)(Z_2)CH^*-CH(Z_3)(Z_4)$

wherein Z1 to Z4 represent the same as defined above, and * represents an asymmetric carbon atom.